DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/29/08 has been entered.

Specification

2. In response to applicant's amendment of the title, the previous title objection is withdrawn.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 4-15 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. The Federal Circuit[1], relying upon Supreme Court precedent[2],

[1] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

[2] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

has indicated that a statutory "process" under 35 U.S.C. 101 must (1) be tied to a particular machine or apparatus, or (2) transform a particular article to a different state or thing. This is referred to as the "machine or transformation test", whereby the recitation of a particular machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility (See *Benson*, 409 U.S. at 71-72), and the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity (See *Flook*, 437 U.S. at 590"). While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform an article nor are positively tied to a particular machine that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. That is, the method includes steps of taking, projecting, calculating, positioning, utilizing, producing, etc. is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally, or without a machine. The cited claims do not positively recite any structure within the body of the claim which ties the claim to a statutory category. Furthermore, the examiner suggests that the structure needs to tie in the basic inventive concept of the application to a statutory category. Structure that ties insignificant pre or post solution activity to a statutory category is not sufficient in overcoming the 101 issue. Examiner notes that the claims 4-6 do not recite a qualifying transformation because there is no meaningful and significant external, non-data depiction of a physical object or substance.

[1] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

[2] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 4-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Peleg et al (US 6,532,036) with Shirato et al (WO/2002/019270), and further in view of Johnson et al (US 6,928,314 B1). Examiner notes that Shirato et al (US 2003/0117675 A1) will be used as an English translation for the Shirato et al (WO/2002/019270) for purposes of examination hereon.

Regarding **claim 4**, Peleg discloses a method for inspecting channel pipes, wherein hemispherical or fully spherical digital images recorded at specific locations in the pipe are calculated and perspective images enabling virtual swiveling are produced, the method comprising:

taking a given known pipe geometry of a pipe (Peleg: fig. 11, figure 12a, b, col. 14, lines 31-67),

projecting a recorded image computationally onto the known pipe geometry (Peleg: col. 15, lines 57-67; images are projected on the side of the pipe); and calculating a one-point perspective image data resulting therefrom for the neighboring location (Peleg: figure 11, 12a, b, col. 5, lines 32-55; combining a sequence of two-dimensional images of a scene to obtain a panoramic mosaic of said scene). Peleg does not disclose an intermediate image is calculated

and represented from the intermediate image data taken at one location for a random neighboring location of a desired fictive camera position.

Shirato, in the same field of endeavor, teaches an intermediate image is calculated and represented from the intermediate image data taken at one location for a random neighboring location of a desired fictive camera position (see paragraphs [0047]-[0050]; any number of virtual cameras can be added, one original image can be viewed from various angles at the same time to output multiple perspective views).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Peleg reference to utilize an intermediate image produced by a desired fictive camera position as suggested by Shirato, to allow actively view the original image from desired angles simultaneously and output multiple perspective views which reduces an overall volume of calculations, allowing for a higher speed of conversion operation (see paragraphs [0050], [0047]).

Johnson, in the same field of endeavor, teaches a pipe geometry of an imaged pipe (see col. 2, lines 52-64; render six images at each point along the colon midline. These images are aligned with the image coordinates and each has a ninety degree field of view. Virtual Endoscopy (VE) views with arbitrary camera orientation and view field can be derived from these images in real time using simple image warp and merge operations. These panoramic scene sequences make it possible to visualize the entire endoluminal surface without further manual navigation).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Peleg with Shirato utilize a pipe geometry of an imaged pipe as suggested by

Johnson, to provide efficient and accurate evaluation of the colon by displaying coronal, sagittal, and axial views of the colon while reducing the interpretation time and improving display mode that enables a user to interpret long segments of the colon at one time (see col. col. 3, lines 19-30).

Regarding **claim 5**, Peleg further discloses calculating at each image point of a 2D-fisheye image P' (Xf, Yf) with known imaging function, the angle of incidence (α, θ) of the spherical coordinates, and from the calculation a corresponding image point in 3D space P (Xr, Yr, Zr) on the pipe surface is represented (Peleg: figure 11).

Regarding **claim 6**, Peleg further discloses calculating from the desired fictive camera position and its viewing angle in space (Peleg: figure 11), an image point located in a desired section of an image plane (Peleg: figure 11), and taking from image point coordinates (Xb, Yb) of the image plane and assuming a projection center at a distance F from the image plane B (Peleg: figure 11), calculating corresponding image point coordinates (Xr, Yr, Zr) on the inner surface of the known pipe geometry and corresponding image point coordinates (Xf, Yf) of a fisheye image (Peleg: figure 11), so that the color and brightness value of an image point on image plane B with Pn (Xb, Yb) = P (Xf, Yf) is obtained (Peleg: col. 15, lines 27-64).

6. **Claims 7-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al (US 6,928,314 B1) with Peleg et al (US 6,532,036), and further in view of Shirato et al (WO/2002/019270). Examiner notes that Shirato et al (US 2003/0117675 A1) will be used as an English translation for the Shirato et al (WO/2002/019270) for purposes of examination hereon.

Regarding **claim 7**, Johnson discloses a method for inspecting a pipe having a known geometry comprising:

positioning a camera within the pipe (see fig. 9, col. 15, lines 41-64; obtaining a view point within the volume array which is used as a virtual camera location. At block 82 a view direction is obtained which is used as the orientation direction of the virtual camera. The view point and view direction may be derived from along the colon midline, the centroid of the prior image rendering, or may be manually specified by the user. For each display point or pixel in the rendered view of the image, the rendering process determines the direction for a ray from the view point though the pixel);

taking a series of discreet images having associated optical centers of exposure with the camera at spaced locations along an axis of the pipe (see col. 9, lines 16-52; Scanning is preferably performed on a fast helical CT scanner. As noted above, other medical imaging technologies may be substituted for a fast helical CT scanner without loss of generality. This technology requires a volumetric data set that covers the entire structure). Johnson does not disclose utilizing the known geometry of the pipe and the discreet images, creating fictive images for sections of the pipe which are between the spaced locations and outside the optical centers of exposure; and producing a virtual model of the pipe utilizing the series of discreet images and the fictive images.

Peleg, in the same field of endeavor, teaches utilizing the known geometry of the pipe (Peleg: fig. 11, figure 12a, b, col. 14, lines 31-67) and the discreet images (Peleg: col. 15, lines 57-67; images are projected on the side of the pipe) and producing a virtual model of the pipe utilizing the series of discreet images (Peleg: figure 11, 12a, b, col. 5, lines 32-55; combining a sequence of two-dimensional images of a scene to obtain a panoramic mosaic of said scene).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify Johnson to utilize known geometry to produce a virtual model as suggested by Peleg, to create panoramic image mosaics that account for image parallax, forward motion, camera motions that are combination of translations and rotations and camera zoom (see col. 4, lines 33-39).

Shirato, in the same field of endeavor, teaches creating fictive images for sections of the pipe which are between the spaced locations and outside the optical centers of exposure (see paragraphs [0047]-[0050]; any number of virtual cameras can be added, one original image can be viewed from various angles at the same time to output multiple perspective views).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Johnson with Peleg to utilize an fictive images as suggested by Shirato, to allow actively view the original image from desired angles simultaneously and output multiple perspective views which reduces an overall volume of calculations, allowing for a higher speed of conversion operation (see paragraphs [0050], [0047]).

Regarding **claims 8, 9**, Johnson, Peleg with Shirato discloses all elements as mentioned above in claim 7. Johnson, Peleg with Shirato as mentioned in claim 7 does not disclose taking hemispherical or fully spherical digital images within the pipe at the spaced locations and taking the series of discreet images with a fisheye lens.

Shirato, in the same field of endeavor, teaches taking hemispherical or fully spherical digital images within the pipe at the spaced locations (see paragraph [0033], [0047]) and taking the series of discreet images with a fisheye lens (see paragraph [0031], [0036]).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Johnson, Peleg with Shirato as mentioned in claim 7 to utilize spherical digital

images and fisheye lens and as suggested by Shirato, to allow actively view the original image from desired angles simultaneously and output multiple perspective views which reduces an overall volume of calculations, allowing for a higher speed of conversion operation (see paragraphs [0050], [0047]).

Regarding **claims 10-14**, Johnson, Peleg with Shirato discloses all elements as mentioned above in claim 7. Johnson, Peleg with Shirato as mentioned in claim 7 does not disclose inspecting the pipe by simulating a continuous, axial movement through the virtual model of the pipe; projecting both the series of discreet images and the fictive images onto an inner surface of an imaginary pipe having the known geometry to create the virtual model; for each of the discreet images, calculating an angle of incidence and a corresponding image point in 3D-space; building a 3D-scene for each of the spaced locations; and producing two-dimensional, perspective views, enabling swiveling, tilting, rotating and magnifying of the views.

Peleg, in the same field of endeavor, teaches inspecting the pipe by simulating a continuous, axial movement through the virtual model of the pipe (see fig. 12a, 12b); projecting both the series of discreet images and the fictive images onto an inner surface of an imaginary pipe having the known geometry to create the virtual model (see fig. 12a); for each of the discreet images, calculating an angle of incidence and a corresponding image point in 3D-space (see fig. 11); building a 3D-scene for each of the spaced locations (see fig. 11); and producing two-dimensional, perspective views (see col. 5, lines 30-40, col. 5, lines 15-20), enabling swiveling (see fig. 15), tilting (see col. 12, lines 1-15), rotating (see fig. 15) and magnifying of the views (see col. 9, lines 65-67, col. 10, lines 1-13).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify Johnson, Peleg with Shirato as mentioned in claim 7 to utilize virtual model, angle of incidence, 3D-scene and different perspectives as suggested by Peleg, to create panoramic image mosaics that account for image parallax, forward motion, camera motions that are combination of translations and rotations and camera zoom (see col. 4, lines 33-39).

Regarding **claim 15**, Johnson discloses making forwardly directed exposures and rearwardly directed exposures within the pipe (see col. 4, lines 14-23, col. 14, lines 1-13).

Response to Arguments

7. Applicant's arguments filed on 12/29/08, in regards to claim 4, have been fully considered but they are not persuasive. Applicant argues that the references, Peleg with Shirato, do not disclose the claim invention by summarizing the Peleg and Shirato inventions separately (see pg. 7, last paragraph). This argument is not considered persuasive since applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Examiner notes that the claim is rejected under a new ground(s) of rejection and the rejection can be seen above and therefore the applicant's arguments are moot.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD PARK whose telephone number is (571)270-1576. The examiner can normally be reached on M-F 10:30 - 20:00, (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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